REMARKS

The present amendment is in response to the Office Action dated May 12, 2006. Claims 1-32 and 39-44 are now present in this case. Claims 1, 5, 30, and 39 are amended.

Claims 1-5, 15, 16, 17, 18, 28, 29, 30, 31, 32, and 39-44 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Publication No. 2005/0038619 A1 to Degani. Further, claims 6-14, and 19-27 stand rejected under 35 U.S.C. § 103(a) as unpatentable by Degani. The applicants respectfully traverse these rejections and request reconsideration.

The use of contrast enhanced imaging is well known in the art. Although the concept was not clearly understood, it was generally believed that the washout characteristic was strongly indicative of a malignant lesion and, conversely, weakly indicative of a non-malignant or benign lesion. (See pending application, page 5, paragraph 14.) Degani describes a system in which all portions of the image are analyzed and colored. In the example provided in Degani, all pixels in an image are colored either red, green, or blue depending on the image intensity characteristics.

In contrast to Degani, the present system recognizes the importance of a hierarchical analysis of the medical imaging information. That is, the hierarchical system recited herein performs a "worst-case" analysis of the imaging data. If a particular region of interest (ROI) is determined to meet the characteristics of a highly malignant lesion, there is no need to perform the other steps of a hierarchical analysis. Simply put, the physician is looking for, and the present system provides, an analysis of the most highly likely malignant regions. Only if the analysis fails to reveal the highly malignant regions, does the system move to an analysis of a less highly likely (*i.e.*, probable) malignant region. Finally, the third step of analysis is performed only in the event that the ROI contains no tissues that are highly likely malignant or probable malignant tissues.

Specifically, claim 1 is a method that recites *inter alia* "automatically determining whether a portion of a tissue volume exhibits an imaging signal washout behavior." In addition, "if a portion of the tissue volume exhibits the imaging signal washout behavior, analyzing the portion of the tissue volume to determine a section of

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the portion of the tissue volume exhibiting the greatest degree of washout behavior." Thus, the method involves a hierarchical analysis in which the tissue volume is analyzed for washout characteristic behavior and, if it contains washout characteristic behavior, performing a further analysis to determine the portion of the tissue volume exhibiting the greatest degree of washout behavior.

Claim 1 further recites "only in the event that the portion of the tissue volume fails to exhibit the imaging signal washout behavior, automatically determining whether the portion of a tissue volume exhibits an imaging plateau behavior." The method of claim 1 further recites "if a portion of the tissue volume exhibits imaging signal plateau behavior, analyzing the portion of the tissue volume to determine a section of the portion of the tissue volume exhibiting the greatest degree of plateau behavior." Thus, the method recited in claim 1 performs an analysis to detect signal imaging plateau behavior only if there was no detection of imaging signal washout behavior.

Finally, claim 1 recites "only in the event that the portion of the tissue volume fails to exhibit the imaging signal washout behavior and fails to exhibit the imaging signal plateau behavior, automatically determining whether the portion of the tissue volume exhibits an imaging signal persistent enhancement behavior" as well as "if a portion of the tissue volume exhibits the imaging signal persistent enhancement behavior, analyzing the portion of the tissue volume to determine a section of the portion of the tissue volume exhibiting the greatest degree of persistent enhancement behavior." Thus, the method recited in claim 1 only performs an analysis of the tissue volume to determine persistent enhancement behavior if neither the imaging signal washout characteristic nor the imaging signal plateau characteristic were exhibited. Degani does not teach or suggest a hierarchical analysis nor the determination of a section of the tissue volume having the greatest degree of the respective characteristic behaviors. Accordingly, claim 1 is clearly allowable over Degani. Claims 2-4 are also allowable in view of the fact that they depend from claim 1, and further in view of the recitation in each of those claims.

Claim 5 is a method claim for analysis of a candidate voxel set corresponding to a tissue volume and recites *inter alia* "determining whether a

candidate voxel set exhibits an imaging signal washout behavior" as well as "only in the event that the candidate voxel set fails to exhibit an imaging signal washout behavior, determining whether the candidate voxel set exhibits an imaging signal plateau behavior." Finally, claim 5 recites "only in the event that the candidate voxel set fails to exhibit either an imaging signal washout behavior or an imaging signal plateau behavior, determining whether the candidate voxel set exhibits an imaging signal persistent enhancement behavior." As discussed above with respect to claim 1, Degani does not teach or suggest this form of hierarchical analysis. However, the worst-case analysis provided by the techniques recited in claim 5 provide the physician with a speedy accurate analysis of tissues that are most likely malignant and only performs secondary analysis (*i.e.*, a plateau behavior analysis) in the event that the most highly likely malignant tissues are not detected. Finally, the method recited in claim 5 performs a third level of an analysis only in the event that neither the most likely malignant tissues (*i.e.*, tissues exhibiting washout characteristic behavior) or probable malignant tissues (*i.e.*, tissues exhibiting plateau behavior characteristics) are detected. Degani does not teach or suggest such hierarchical analysis. Accordingly, claim 5 is clearly allowable over Degani. Claims 6-29 are also allowable in view of the fact that they depend from claim 5, and further in view of the recitation in each of those claims.

Claims 30 and 31 are also independent method claims directed to techniques for hierarchical analysis of contrast enhanced medical imaging information. As noted above with respect to claims 1 and 5, Degani does not teach or suggest such hierarchical analysis. For the sake of brevity, those arguments need not be repeated herein with respect to claims 30 and 31. However, it is clear that both claims 30 and 31 recite a hierarchical analysis in which a second stage of analysis (*i.e.*, analysis for the detection of plateau characteristic behavior) does not occur unless no positive results are found in the initial analysis (*i.e.*, washout behavior characteristic). Thus, claims 30 and 31 are clearly allowable over Degani. Claim 32 is also allowable in view of the fact that it depends from claim 31, and further in view of the recitation in each of those claims.

Claim 39 is a computer readable medium claim containing program instructions that cause a computer to perform a hierarchical analysis of imaging signal

intensities. As discussed above with respect to claims 1 and 5, Degani does not teach or suggest any hierarchical analysis. For the sake of brevity, the arguments need not be repeated herein with respect to claim 39. However, it is clear that claim 39 performs a sequential hierarchical analysis in which a second stage of analysis (*i.e.*, imaging signal plateau behavior analysis) is not performed unless no candidate voxels exhibit the imaging signal washout behavior. In addition, it is clear that the third stage of hierarchical analysis (*i.e.*, imaging signal persistent enhancement behavior analysis) is only performed in the event that the candidate voxel set does not exhibit either imaging signal washout behavior or imaging signal plateau behavior. As noted above, Degani does not teach or suggest such hierarchical analysis. Accordingly, claim 39 is clearly allowable over Degani. Claims 40-44 are also allowable in view of the fact that they depend from claim 39, and further in view of the recitation in each of those claims.

In view of the above amendments and remarks, reconsideration of the subject application and its allowance are kindly requested. The applicant has made a good faith effort to place all claims in condition for allowance. If questions remain regarding the present application, the Examiner is invited to contact the undersigned at (206) 628-7640.

Respectfully submitted,
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